

Claims

1. A semitransparent optical detector comprising:
a semitransparent PIN diode having at least one polycrystalline semiconductor layer.
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2. The detector of claim 1, wherein the polycrystalline semiconductor is polycrystalline silicon.
3. The detector of claim 2, wherein the polycrystalline silicon is microcrystalline.
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4. The detector of claim 1, wherein the polycrystalline semiconductor is a polycrystalline alloy of silicon and germanium.
5. The detector of claim 4, wherein the polycrystalline alloy is microcrystalline.
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6. The detector of claim 1, wherein the PIN diode has another layer of at least one of an amorphous semiconductor and a microcrystalline semiconductor.
7. The detector of claim 1, further comprising:
a transparent substrate upon which the PIN diode is disposed.
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8. The detector of claim 7, further comprising:
a transparent conductor disposed on a surface of the PIN diode.
- 25 9. A method of making a semitransparent optical detector comprising:
fabricating an amorphous semiconductor PIN diode on a transparent conductor; and
recrystallizing the amorphous semiconductor.
- 30 10. The method of claim 9, recrystallizing further comprising:
placing the amorphous semiconductor in a processing furnace.

11. The method of claim 10, further comprising:
during recrystallizing, flowing a forming gas of H₂ and N₂ through the processing furnace.
12. The method of claim 11, further comprising:
raising a temperature in the processing furnace to at least about 800°C.
13. The method of claim 9, fabricating further comprising:
depositing amorphous silicon as the amorphous semiconductor.
14. The method of claim 9, recrystallizing further comprising:
depositing the transparent conductor on a transparent substrate; and
rapidly annealing the amorphous semiconductor with high intensity heat applied to a side thereof away from the transparent substrate.
15. The method of claim 14, further comprising:
exposing the amorphous semiconductor to an argon plasma before rapidly annealing.
16. The method of claim 9, recrystallizing further comprising:
exposing a region of the amorphous semiconductor to a laser pulse having sufficient energy to locally raise a temperature of the amorphous semiconductor above about 800°C.
17. A method of making a semitransparent optical detector comprising:
depositing a transparent conductor onto a transparent substrate; and
growing a polycrystalline PIN diode on the transparent conductor using high-temperature thermal chemical vapor deposition.
18. The method of claim 17, growing the polycrystalline PIN diode further comprising:

raising a temperature at which growing is performed above about 800°C.

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